

AMENDMENT(S) TO THE SPECIFICATION

Please insert the following paragraph beginning at page 1, following the title of the invention:

CROSS REFERENCE TO RELATED APPLICATION

The present application is a 35 U.S.C. §§ 371 national phase conversion of PCT/EP2003/008965, filed 13 August 2003, which claims priority of German Application No. 102 42 297.4 filed 12 September 2002. The PCT International Application was published in the German language.

Please delete the heading “Description” at page 1, line 3.

Please replace the paragraph beginning at page 1, line 8, with the following rewritten paragraph:

DE 199 44 875 A1, for example, discloses a ball screw with a spindle and a nut surrounding the nut latter, and also with balls arranged in between[[,]] the spindle and the nut. The balls which are arranged in such a way such that they can roll in a thread groove formed on the outer surface of the spindle and in a corresponding thread groove formed on the inner surface of the nut. Radial through-openings are also ~~Also~~ provided on the nut ~~are radial through-openings~~, in which deflecting pieces are fitted for the return of the balls respectively from a run-out end of a common turn of the thread grooves to a run-in end of ~~this~~ the turn. The nut is configured as a one-piece sleeve with a circular-cylindrical casing. Each ~~and each~~ fitted deflecting piece is arranged in the associated through-opening of the nut completely within the outer casing. Seen in cross section, the deflecting pieces are formed in an approximately U-shaped manner ~~and have~~ including a base and two side plates adjoining the base. Formed between these side plates is a deflecting channel or a deflecting groove for the return of the balls. The deflecting pieces may be produced for example from plastic by ~~the~~ an injection-molding process. The deflecting pieces may be given a spatially complicated form, which is intended to assist satisfactory deflection of the balls. The shaping of the deflecting pieces is subject to limits, however. This is ~~so~~ because, if the deflecting piece is to be produced for example from plastic by the injection-molding process, it is not possible for shaping to take any

~~desired~~ form ~~desired~~. For example, ~~in the case of~~ for spatially very complicated shapings, problems may occur with the opening of the injection molding tool because of undercuts. Or very sophisticated slide molds are required, ~~increasing~~ which increase the production costs for such deflecting pieces in such a way as to make their use problematical from a commercial aspect.

Please replace the paragraph beginning at page 2, line 15, with the following rewritten paragraph:

Summary of the Invention

The object of the present invention is to provide a ball screw ~~for according to the features of the preamble of claim 1~~ in which the deflecting piece can be produced in a simple manner.

Please replace the paragraph beginning at page 2, line 19, with the following rewritten paragraph:

According to the invention, this object is achieved by ~~the~~ each deflecting piece being ~~composed~~ comprised of two partial deflecting pieces, and a parting plane dividing the deflecting channel longitudinally. In ~~this the case of the~~ ball screw according to the invention, complicated shapings of the deflecting pieces can ~~take place~~ be produced without requiring sophisticated injection molding tools ~~being required~~. Even complicated spatial shapings which in the production of known one-part deflecting pieces necessitate pronounced undercuts, and consequently require sophisticated slide molds, are possible. The two partial deflecting pieces can be molded in one operation in a common injection molding tool. There is no longer any need for sophisticated undercuts or complicated slide molds. The two partial deflecting pieces merely need to be joined together ~~and then they~~ to form the deflecting piece.

Please replace the paragraph beginning at page 3, line 10, with the following rewritten paragraph:

In the case of the customary individual deflection, a number of complete rows of balls, which respectively extend over one turn, are provided in the spindle nut. In this case, the deflecting piece reaches over this one turn.

Please replace the paragraph beginning at page 3, line 14, with the following rewritten paragraph:

However, complete rows of balls which extend over more than one turn, for example two turns, may also be provided. In this case, the deflecting piece reaches over two turns, wherein the run-in end ~~being~~ is formed on the side of the first turn and the run-out end ~~being~~ is provided on the side of the second turn. Normally, individual deflections are also customary because it is only in this way that the forces acting in the respective rows of balls on account of the deflecting operation remain below a critical value. Above the critical value, undesired running noises or operational disruptions may occur because of jamming of the balls.

Please replace the paragraph beginning at page 4, line 7, with the following rewritten paragraph:

The one side plate may be formed in one piece on the one partial deflecting piece and the other side plate may be formed in one piece on the other deflecting piece. The one partial deflecting piece may then have one part of the base and the other partial deflecting piece may have another part of the base, making it ~~being~~ possible for the two parts of the base to complement one another to form the complete base of the deflecting channel of the deflecting piece.

Please replace the paragraph beginning at page 4, line 15, with the following rewritten paragraph:

In a particularly favorable way, the two partial deflecting pieces may be captively connected to one another, in particular by a film hinge. In this way there is no longer any need for sophisticated sorting of matching partial deflecting pieces. If a film hinge is to be provided, it can be ~~provided~~ produced in one operation with the production of the partial deflecting pieces. The film hinge is then preferably connected in one piece to both partial deflecting pieces. In this case, there is already satisfactory alignment of the two partial deflecting pieces in relation to one another. The two partial deflecting pieces then merely need to be folded together~~[[,]]~~. ~~The the~~ film hinge ~~permitting~~ permits a folding angle of 180°, so that the one partial deflecting piece can be folded for example by 180° until it fits onto the other partial deflecting piece. For simple production, and also for simple assembly of the deflecting pieces, it may be expedient for the two partial deflecting pieces to be

formed point-symmetrically in a sectional plane arranged transversely to the parting plane, with respect to a point of symmetry lying in the parting plane. On account of the symmetry, there is no need for special orientation for installation of the deflecting pieces in the spindle nut.

Please replace the paragraph beginning at page 5, line 13, with the following rewritten paragraph:

Both side plates of the deflecting piece have a free end facing the thread groove of the spindle. Both free ends may be respectively provided ~~at their free end, facing the thread groove of the spindle,~~ with a blade for engagement between the ball and the thread groove of the threaded spindle, ~~so that to reduce~~ the effective forces during the deflection of the balls ~~are reduced~~. The blades may have spatially demanding contours on the finished deflecting piece. The clear distance between the two free ends of the side plates may be made ~~to be~~ significantly less than the ball diameter. There are no longer difficulties in injection-molding, since the parting plane indeed passes through the deflecting channel, and consequently the two partial deflecting pieces can also be produced with simple injection molding tools.

Please replace the paragraph beginning at page 6, line 3, with the following rewritten paragraph:

The two-part configuration of the deflecting piece also permits the formation on the deflecting piece of ball guiding surfaces which engage in the thread groove of the spindle, in order to lift the balls off ~~from~~ the thread groove of the spindle. ~~In the case of~~ known deflecting pieces, the blades mentioned further above, or else the ball guiding surfaces, cannot be produced~~[[,]]~~ or can be produced only in an extremely sophisticated way, since the shaping requires demanding tools.

Please replace the paragraph beginning at page 6, line 11, with the following rewritten paragraph:

~~Both~~ Each partial deflecting ~~pieces~~ piece may be respectively provided with a hook and with a hook receptacle~~[[,]]~~ a . The hook and a the hook receptacle of each of the two partial deflecting pieces ~~being~~ are able to hook in one another, gripping one another. ~~These~~ The hooks and hook

receptacles may ~~in particular~~ be formed in one piece on the partial deflecting pieces and may already be allowed for in the injection molding tool. The two partial deflecting pieces then merely need to be folded together, wherein the respective hooks and hook receptacles ~~hooking hook~~ in one another or ~~interlocking interlock~~. The deflecting pieces are then ready to ~~install~~ be installed and also cannot be separated from one another any longer without external intervention.

Please replace the paragraph beginning at page 6, line 23, with the following rewritten paragraph:

Preferably, the hook is provided at ~~the~~ one circumferential end of each partial deflecting piece and the hook receptacle is provided at the opposite, other circumferential end. This formation is suitable ~~in particular~~ particularly for partial deflecting pieces according to the invention which are point-symmetrical to one another ~~in the way~~ as described above. In this case, the two partial deflecting pieces can also be formed identically with the hooks and hook receptacles formed on them.

Please replace the paragraph beginning at page 7, line 10, with the following rewritten paragraph:

Brief Description of the Drawings

The invention is explained ~~in more detail~~ below on the basis of an exemplary embodiment that is represented in ~~altogether nine~~ the figures, in which:

Figure 1 shows a perspective representation of a deflecting piece according to the invention ~~in a perspective representation,~~

Figure 2 shows the deflecting piece according to the invention as shown in Figure 1, but folded together,

Figure 3 shows the deflecting piece according to the invention in an elevation view,

Figure 4 shows a section through the deflecting piece according to the invention from Figure 3 along the line IV-IV,

Figure 5 shows an elevation of the perspective representation of the deflecting piece according to the invention as shown in Figure 1,

Figure 6 shows a further elevation of the perspective representation as shown in Figure 1,

Figure 7 shows a section along the line VII-VII in Figure 6,

Figure 8 shows a detail of the deflecting piece according to the invention and

Figure 9 shows a schematic representation of a ball screw according to the invention.

Please replace the paragraph beginning at page 8, line 9, with the following rewritten paragraph:

Description of a Preferred Embodiment

The ball screw according to the invention that is depicted in Figure 9 comprises a spindle nut 2[[,]] arranged on a spindle 1[[,]] and balls 3, which are merely represented here by dashed lines. The balls 3 can roll on a thread path 4. The thread path 4 comprises a thread groove 5 formed ~~on~~ in the spindle 1 and a thread groove 6 formed on the spindle nut 2. The spindle nut 1 is provided with a number of receptacles 7, arranged distributed over the circumference of the nut, for receiving deflecting pieces 2. Each deflecting piece comprises a deflecting channel 9 for the return of the balls 3 respectively from a run-out end 10 to a run-in end 11 of at least one common turn 12 of the thread path 4.

Please replace the paragraph beginning at page 8, line 21, with the following rewritten paragraph:

Figure 1 ~~clearly~~ shows that the deflecting piece 8 is formed by two partial deflecting pieces 13, 14, which are captively connected to one another in one piece by means of a film hinge 15. Figure 5 clearly shows for example the formation of the film hinge 15. The arrows provided in Figure 5 show how the two partial deflecting pieces 13, 14 are folded together to form the deflecting piece 8 according to the invention.

Please replace the paragraph beginning at page 9, line 18, with the following rewritten paragraph:

Figure 4 shows a cross section through the deflecting piece 8 according to the invention. It is ~~[[,]] it being clearly evident here~~ that the film hinge 15 is pivoted by approximately 180° after a folding movement of the two partial deflecting pieces 13, 14 onto one another. The parting plane 16 is arranged in such a way that the two partial deflecting pieces 13, 14 can be produced alongside one another in a mold of an injection molding tool, and no undercuts ~~being~~ are provided on the two partial deflecting pieces 13, 14, or at least only undercuts which can be produced with a simple injection molding tool.

Please replace the paragraph beginning at page 10, line 4, with the following rewritten paragraph:

~~The representation in~~ Figure 6 reveals that the two partial deflecting pieces 13, 14 are formed point-symmetrically with respect to a point of symmetry P lying in the parting plane 16. The ~~[[,]] the~~ point of symmetry ~~lying~~ lies in a sectional plane S arranged transversely on the parting plane 16. On account of the symmetrical arrangement, identical partial deflecting pieces 13, 14 are produced. When the two identical partial deflecting pieces 13, 14 are folded together to form the deflecting piece 8 according to the invention, there is no need for special orientation for installation in the receptacle 7 of the spindle nut 2.

Please delete pages 13 and 14 in their entirety.